

What is claimed is:

- SAC* 1. An apparatus for changing the speed of bicycles, the apparatus comprising:
a driven sprocket receiving the driving force of a driving sprocket;
5 a speed controlling portion, that is comprising:
a carrier that is fixed to one side of the driven sprocket, and a plurality of planetary gears is installed;
at least two sun gears that are engaging with each step of the planetary gears and ratchet-teeth is formed along inner circumference;
10 a ring gear that is engaging with the other side of the planetary gears;
an output portion, that is comprising:
a hub shell transferring the driving force to a rear wheel by means of the carrier and the ring gear;
15 a clutch means that is mediating the driving force selectively with being mounted between the carrier and the hub shell, and the ring gear and the hub shell; and
a speed-change controlling portion, that is comprising:
20 a hub shaft having a pawl-positioning portion;
at least two set of pawls which are engaging or releasing with the ratchet-teeth of the at least two sun gears;
a pawl-controlling ring that is controlling the position of the at least two set of pawls;
25 a transforming disk having a groove along outer circumference, which a hooking portion is formed on the outer circumference in order to transform the position of the pawl-controlling ring via a mediating portion;
a spring that is for restoring position of the transforming disk to original position;
a spacing portion enabling the transforming disk to rotate freely.

2. The apparatus for changing speed of bicycles of the claim 1,
wherein on the inner surface of the pawl-controlling ring, grooves are formed
symmetrically with respect to the center point.
- 5 3. The apparatus for changing speed of bicycles of the claim 2,
wherein the grooves of the pawl-controlling ring are not formed with the same
angle interval with respect to the center point.
- 10 4. The apparatus for changing speed of bicycles of the claim 2,
wherein the grooves are composed of a couple of sloping groove and a couple of
angular groove alternatively.
- 15 5. The apparatus for changing speed of bicycles of the claim 1,
wherein the pawls are installed in the pawl-positioning portion of the hub shaft
with the same angular interval.
6. The apparatus for changing speed of bicycles of the claim 1,
wherein the pawls are comprising:
a sag portion that is positioning inside of the pawl-controlling ring; and
20 a stopper portion that is engaging or releasing the ratchet-teeth which is
formed inner circumference of the sun gear.
- 25 7. The apparatus for changing speed of bicycles of the claim 6,
wherein the pawls, which are positioning relatively far from the pawl-controlling
ring, are further comprising an extended portion that is thinner than pawl body,
whereby preventing the pawl from engaging other elements.
8. The apparatus for changing speed of bicycles of the claim 1,
wherein the mediating portion is comprising:

- a splined groove that is formed on one side of the pawl-controlling ring;
a connecting portion that is engaging with the splined groove and a coupling
groove is formed therein; and
a pawl ring that is installed in the coupling groove, mediating the rotational
5 force with being engaging with a splined portion formed in the transforming disk.

9. The apparatus for changing speed of bicycles of the claim 1,
wherein the spacing portion is comprising:

- 10 a sustaining portion sustaining a bear ring, which is mounted between the
carrier and the sustaining portion;
a fixed disk that is fixed to the hub shaft; and
a plurality of spacer pins that is fixed to the fixed disk and contacting with
the sustaining portion through an arc groove formed in the transforming disk.

15 10. The apparatus for changing speed of bicycles of the claim 9,
wherein the sustaining portion is rotatable and a through hole is formed therein.

11. The apparatus for changing speed of bicycles of the claim 1, in
case of comprising more than two set of pawls, a plurality of the pawl-controlling
20 ring is installed between each set of pawls.

12. The apparatus for changing speed of bicycles of the claim 1,
wherein the clutch means is comprising:

- 25 a clutch ring that is a group of pins is formed thereof; and
a sloping portion that is formed outer circumference of the carrier and the
ring gear.

13. The apparatus for changing speed of bicycles of the claim 1,
wherein the clutch means is comprising:

a first pawl installed in the space between the planetary gears; and
a ring gear portion formed inner circumference of the hub shell.

14. The apparatus for changing speed of bicycles of the claim 1,
5 wherein the clutch means is comprising:

a second pawl installed in the space between the planetary gears;
a ring gear engaged with the planetary gears and the second pawl at the
same time installed outside of the second pawl; and
a third pawl installed between the ring gear and the hub shell.

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15. The apparatus for changing speed of bicycles of the claim 1,
wherein the mediating portion is comprising:

15 a pin fixed on one side of the pawl-controlling ring, and the pin is connected
to the transforming disk through a disk installed between the pawl-controlling ring
and the transforming disk.